

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Hiroaki MATSUDA, et al.

SERIAL NO: 10/086,683

GAU: 1756

FILED: March 4, 2002

EXAMINER:

FOR: CARRIER FOR DEVELOPER FOR DEVELOPING ELECTROSTATIC LATENT IMAGE, IMAGE FORMING METHOD USING SAME AND IMAGE FORMING APPARATUS USING SAME



INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Applicant(s) wish to disclose the following information.

REFERENCES

- The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

RELATED CASES

- Attached is a list of applicant's pending application(s) or issued patent(s) which may be related to the present application. A copy of the patent(s), together with a copy of the claims and drawings of the pending application(s) is attached along with PTO 1449.
- A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

CERTIFICATION

- Each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.
- No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.

DEPOSIT ACCOUNT

- Please charge any additional fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit account number 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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Form PTO 1449 (Modified)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY DOCKET NO. 220228US0	SERIAL NO. 10/086,683		
LIST OF REFERENCES CITED BY APPLICANT		O P E R A T I O N OCT 10 2003 PATENT & TRADEMARK OFFICE LIST		APPLICANT Hiroaki MATSUDA, et al.			
				FILING DATE 03/04/02	GROUP 2852		
U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA	6,468,706	10/22/02	MATSUDA, et al.			
	AB	6,406,826	06/18/02	SUZUKI, et al.			
	AC	6,363,229	03/26/02	SHIRAISHI, et al.			
	AD	6,258,502	07/10/01	NAKAMURA, et al.			
	AE						
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	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						
	AM						
	AN						
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION YES	NO	
	AO						
	AP						
	AQ						
	AR						
	AS						
	AT						
	AU						
	AV						
OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, etc.)							
	AW						
	AX						
	AY						
	AZ						
Examiner					Date Considered		

*Examiner: Initial if reference is considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

LIST OF RELATED CASES

<u>Docket Number</u>	<u>Serial or Patent No.</u>	<u>Filing or Issue Date</u>	<u>Status or Patentee</u>
221058US0	10/114,056	04/03/02	PENDING
219857US0	10/077,752	02/20/02	PENDING
221124US0	10/102,867	03/22/02	PENDING
217549US2	10/020,925	12/19/01	PENDING
219850US0	10/077,813	02/20/02	PENDING
220943US0	10/098,556	03/18/02	PENDING
215226US2	09/985,368	11/02/01	PENDING
214919US0	09/985,347	11/02/01	PENDING
211152US2	09/903,718	07/13/01	PENDING
215990US0	09/996,585	11/30/01	PENDING
216314US2	09/988,142	11/19/01	PENDING
216544US0	09/993,606	11/27/01	PENDING
214138US2	09/982,877	10/22/01	PENDING
212644US0	09/942,574	08/31/01	ALLOWED
215736US0	09/985,375	11/02/01	PENDING
215235US0	09/985,348	11/02/01	PENDING
PER CLIENT	09/843,357	04/26/01	UNKNOWN
PER CLIENT	09/891,652	06/26/01	UNKNOWN
211533US3	09/905,872	07/17/01	PENDING
208932US0	6,468,706	10/22/02	MATSUDA, et al.

<u>Docket Number</u>	<u>Serial or Patent No.</u>	<u>Filing or Issue Date</u>	<u>Status or Patentee</u>
205477US0	09/820,609	03/30/01	PENDING
199885US0	09/734,718	12/13/00	ALLOWED
PER CLIENT	6,406,826	06/18/02	SUZUKI, et al.
198165US0	09/692,430	10/20/00	ALLOWED
224723US0	10/176,578	06/24/02	PENDING
220228US0*	10/086,683	03/04/02	PENDING

*Present application; listed for information.

LIST OF RELATED CASES

<u>Docket Number</u>	<u>Serial or Patent No.</u>	<u>Filing or Issue Date</u>	<u>Status or Patentee</u>
PER CLIENT	6,363,229	03/26/02	SHIRAISHI et al.
192465US0	6,258,502	07/10/01	NAKAMURA et al.
213812US0	09/965,826	10/01/01	PENDING
214503US0	09/964,622	09/28/01	PENDING
215816US0	09/985,738	11/06/01	PENDING
219007US0	10/059,239	01/31/02	PENDING
219257US2	10/079,878	02/22/02	PENDING
219568US0	10/086,415	03/04/02	PENDING
220228US0*	10/086,683	03/04/02	PENDING
221246US0	10/107,157	03/28/02	PENDING
222880US0	10/151,103	05/21/02	PENDING
226638US2	10/212,736	08/07/02	PENDING

*Present application; listed for information.

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LIST OF RELATED CASES

<u>Docket Number</u>	<u>Serial or Patent Number</u>	<u>Filing or Issue Date</u>	<u>Inventor/Applicant</u>
220228US0*	10/086,683	03/04/02	MATSUDA et al.
240051US2	10/615,770	07/10/03	MOCHIZUKI et al.

*Present Application; listed for information
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WHAT IS CLAIMED IS

5

1. A developer, comprising:
a base toner containing at least a binding resin and a coloring agent; and
inorganic fine particles;
10 wherein the base toner satisfies $105 \leq SF-1 \leq 130$ and $120 \leq SF-2 \leq 180$,
wherein $SF-1 = ((\text{absolute maximum length of a particle of the base toner})^2 / \text{area of the particle of the base toner}) \times (\pi/4) \times 100$,
15 wherein $SF-2 = (\text{peripheral length of the particle of the base toner})^2 / (\text{area of the base toner}) \times (1/4\pi) \times 100$,
wherein the inorganic fine particles have an average particle diameter that ranges between 30nm to
20 160 nm.
- 25 2. The developer as claim in claim 1, wherein

FOR INFORMATION
DISCLOSURE
PURPOSES ONLY

Related Pending Application
Related Case Serial No: 10/615,770
Related Case Filing Date: 07-10-03

the inorganic fine particles are formed as silica.

5

3. The developer as claimed in claim 1,
wherein the inorganic fine particles are applied with a
sol-gel technique and are thereby formed as spherical
shaped hydrophobic silica fine particles.

10

4. The developer as claimed in claim 1,
15 wherein the developer contains further inorganic fine
particles having an average particle diameter which is
smaller than the inorganic fine particles.

20

5. The developer as claimed in claim 1,
wherein the developer is combined with a magnetic
particle to function as a carrier.

25

6. An image forming apparatus, comprising:

5 a developer for developing an electrostatic latent image formed on an electrostatic latent image carrier body to form a toner image;

a transfer unit for transferring the toner image to a transfer medium;

10 wherein the developer includes a further developer and a carrier,

wherein the further developer has a base toner containing at least a binding resin and a coloring agent, and inorganic fine particles,

15 wherein the carrier has a magnetic particle,

wherein the base toner satisfies $105 \leq SF-1 \leq 130$ and $120 \leq SF-2 \leq 180$,

20 wherein $SF-1 = ((\text{absolute maximum length of a particle of the base toner})^2 / \text{area of the particle of the base toner}) \times (\pi/4) \times 100$,

wherein $SF-2 = (\text{peripheral length of the particle of the base toner})^2 / (\text{area of the base toner}) \times (1/4\pi) \times 100$,

25 wherein the inorganic fine particles have an average particle diameter that ranges between 30nm to

160 nm.

5

7. The image forming apparatus as claimed in
claim 6, wherein the inorganic fine particles are formed
as silica.

10

8. The image forming apparatus as claimed in
claim 6, wherein the inorganic fine particles are
15 applied with a sol-gel technique and are thereby formed
as spherical shaped hydrophobic silica fine particles.

20

9. The image forming apparatus as claimed in
claim 6, wherein the developer contains further
inorganic fine particles having an average particle
diameter which is smaller than the inorganic fine
25 particles.

5 10. The image forming apparatus as claimed in
claim 6, wherein the developer is combined with a
magnetic particle to function as a carrier.

10

11. The image forming apparatus as claimed in
claim 6, wherein the developer includes a plurality of
colors.

15

20 12. A process cartridge, comprising:
a charge unit charging a photoconductor;
an exposure unit exposing light to the
photoconductor to form an image on the photoconductor;
a development unit developing the image formed
on the photoconductor with a developer;
25 a transfer unit transferring the image formed

on the photoconductor to a transfer medium;

a cleaning unit cleaning the transfer unit;

wherein the developer includes a further developer and a carrier,

5 wherein the further developer has a base toner containing at least a binding resin and a coloring agent, and inorganic fine particles,

wherein the carrier has a magnetic particle,

wherein the base toner satisfies of $105 \leq SF-1$

10 ≤ 130 and $120 \leq SF-2 \leq 180$,

wherein $SF-1 = ((\text{absolute maximum length of a particle of the base toner})^2 / \text{area of the particle of the base toner}) \times (\pi/4) \times 100$,

15 wherein $SF-2 = (\text{peripheral length of the particle of the base toner})^2 / (\text{area of the base toner}) \times (1/4\pi) \times 100$,

wherein the inorganic fine particle has an average particle diameter that ranges between 30nm to 160 nm.

20

13. The process cartridge as claimed in claim
25 12, wherein the inorganic fine particles are formed as

silica.

5

14. The process cartridge as claimed in claim
12, wherein the inorganic fine particles are applied
with a sol-gel technique and are thereby formed as
spherical shaped hydrophobic silica fine particles.

10

15 12, wherein the developer contains further inorganic
fine particles having an average particle diameter which
is smaller than the inorganic fine particles.

20

16. The process cartridge as claim in claim
12, wherein the developer is combined with a magnetic
particle to function as a carrier.

25

17. A image forming method, comprising the
5 steps of:

charging a photoconductor;
exposing light to the photoconductor to form
an image on the photoconductor;
developing the image formed on the
10 photoconductor with a developer;
transferring the image formed on the
photoconductor to a transfer medium;
wherein the developer includes a further
developer and a carrier,
15 wherein the further developer has a base toner
containing at least a binding resin and a coloring agent,
and inorganic fine particles;
wherein the carrier has a magnetic particle,
wherein the base toner satisfies $105 \leq SF-1 \leq$
20 130 and $120 \leq SF-2 \leq 180$,
wherein $SF-1 = ((\text{absolute maximum length of a particle of the base toner})^2 / \text{area of the particle of the base toner})^2 \times (\pi/4) \times 100$,
wherein $SF-2 = (\text{peripheral length of the particle of the base toner}) / \text{area of the base toner} \times (1/4)$
25

π) \times 100,

wherein the inorganic fine particles have an average particle diameter that ranges between 30nm to 160 nm.

5

18. The image forming method as claimed in
10 claim 17, wherein the inorganic fine particles are formed as silica.

15

19. The image forming method as claimed in
claim 17, wherein the inorganic fine particles are applied with a sol-gel technique and are thereby formed as spherical shaped hydrophobic silica fine particles.

20

20. The image forming method as claim in
25 claim 17, wherein the developer contains further

inorganic fine particles having an average particle diameter which is smaller than the inorganic fine particles.

5

21. The image forming method as claim in
claim 17, wherein the developer is combined with a
10 magnetic particle to function as a carrier.

ABSTRACT OF THE DISCLOSURE

A developer, which includes a base toner containing at least a binding resin and a coloring agent; and inorganic fine particles; wherein the base toner satisfies $105 \leq SF-1 \leq 130$ and $120 \leq SF-2 \leq 180$,
5 wherein $SF-1 = ((\text{absolute maximum length of a particle of the base toner})^2 / \text{area of the particle of the base toner}) \times (\pi/4) \times 100$, wherein $SF-2 = (\text{peripheral length of the particle of the base toner})^2 / (\text{area of the base toner}) \times (1/4\pi) \times 100$,
10 wherein the inorganic fine particles have an average particle diameter that ranges between 30nm to 160 nm.

FIG.1

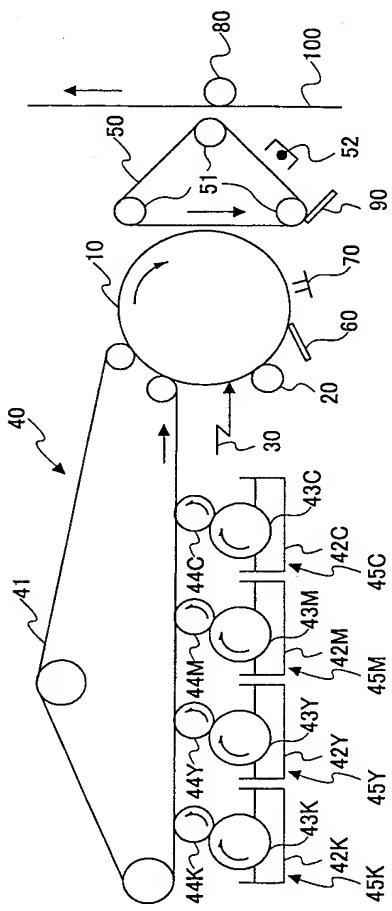


FIG.2

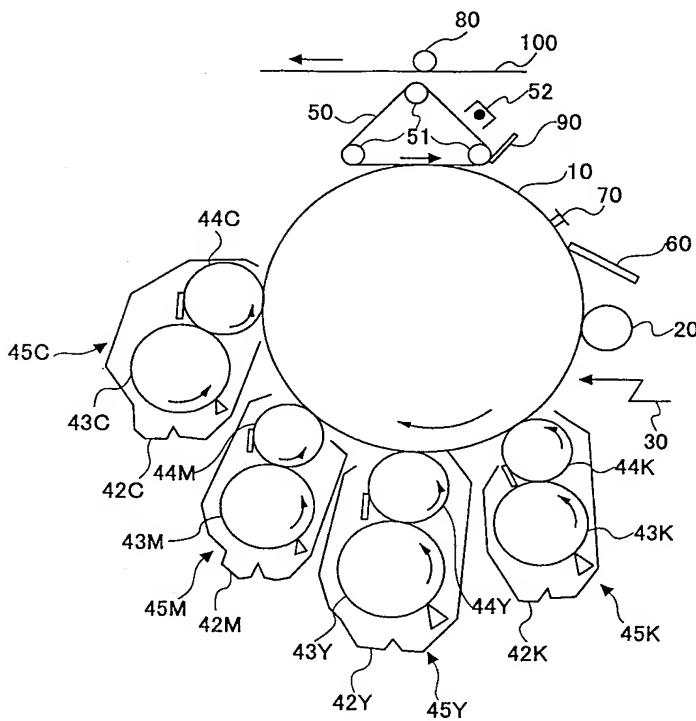


FIG.3

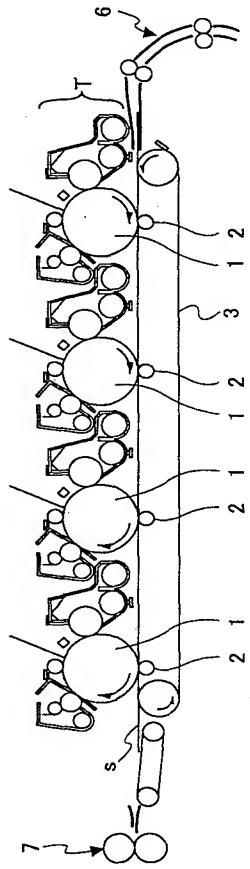


FIG.4

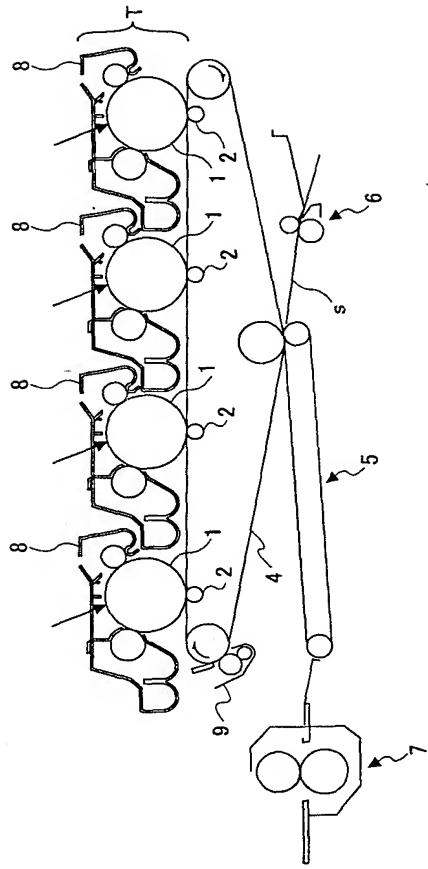


FIG.5

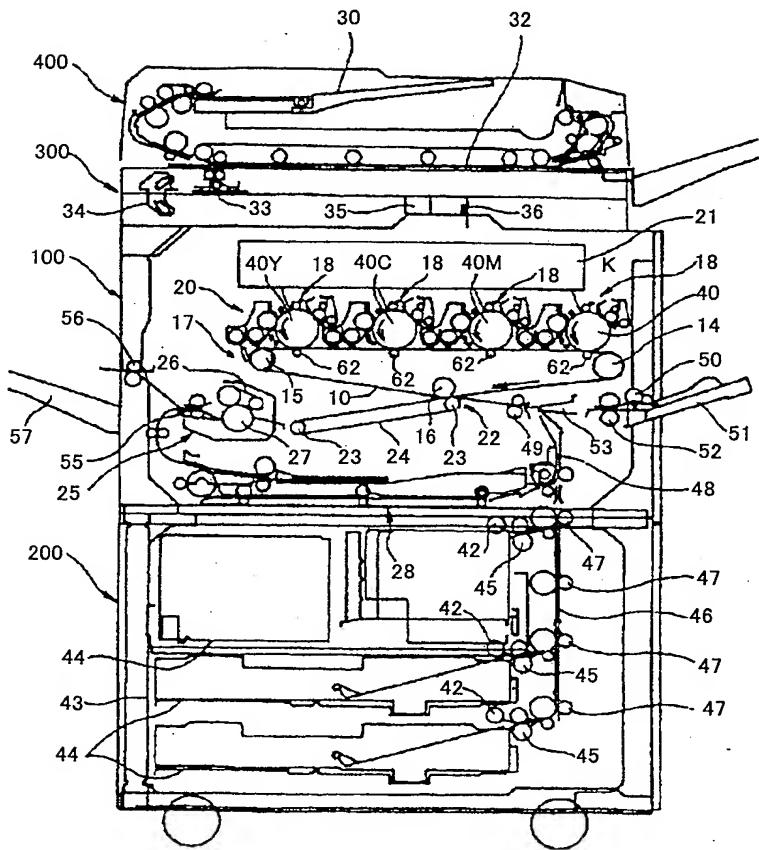


FIG. 6

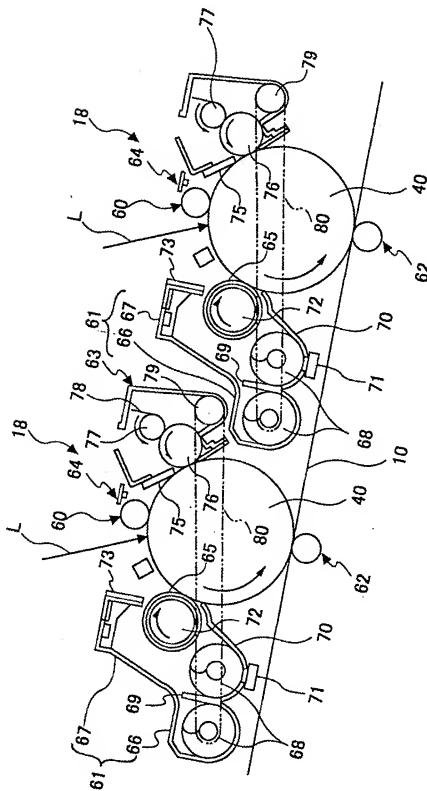


FIG.7

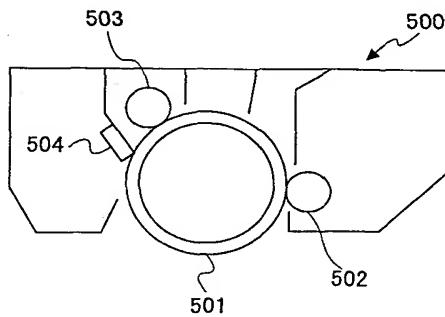


FIG.8

